

Application No. 10/673,996
Filed: September 29, 2003
TC Art Unit: 2882
Confirmation No.: 2809

REMARKS

The foregoing Amendment is filed in response to the official action dated December 28, 2004. Reconsideration is respectfully requested.

The status of the claims is as follows:

Claims 1-18 are currently pending.

Claims 1-9 and 11-17 stand rejected.

Claims 10 and 18 are objected to.

Claims 1, 6, 10, 13, and 18 have been amended.

Claims 9, 12, 14, and 16-17 have been canceled without prejudice.

Claims 19-20 have been added.

Claims 13 and 15-18 were rejected under 35 U.S.C. 112, second paragraph, for failure to explicitly recite an optical detector and one or more X-ray detectors. The Applicants respectfully traverse this rejection. There is no indication in the specification of the present patent application that these particular types of detectors are themselves critical features or that they are essential to the present invention. There is no mention of either of these elements in the abstract, and the specification notes explicitly (see page 11, lines 25-30, of the

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application) that in some embodiments, a separate optical detector is not required. In this regard, MPEP 2164.08(c) states that:

"... an enablement rejection based on the grounds that a disclosed critical limitation is missing from a claim should be made only when the language of the specification makes it clear that the limitation is critical for the invention to function as intended. Broad language in the disclosure, including the abstract, omitting an allegedly critical feature, tends to rebut the argument of criticality."

Therefore, the Applicants respectfully submit that the rejection of these claims under 35 U.S.C. 112 should be withdrawn. (Notwithstanding the above arguments, claim 13 has been amended to recite the optical and X-ray detectors in order to distinguish over the cited art.)

Claims 6, 7, 11-13, 15 and 16 were rejected under 35 U.S.C. 102(b) over Kaiser et al. (U.S. Patent No. 6,370,221). The Applicants have amended independent claims 6 and 13 in order to clarify the distinction of the present invention over the cited art. Claims 12 and 16 have been canceled.

Claim 6 is drawn to apparatus for X-ray analysis of a sample, comprising an X-ray excitation source, an optical radiation source, and corresponding X-ray and optical detectors. The claim

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has been amended to incorporate the limitation of claim 9, now canceled, and thus recites that a polycapillary optic focuses both the X-ray beam and optical radiation onto a spot on the sample. The optical detector receives the optical radiation that is reflected from the spot and generates an alignment signal.

Kaiser describes a method of setting a position of an object of measurement in apparatus for X-ray fluorescence measurement. The X-rays used to irradiate the surface of the sample are restricted by a collimator 17. The beam of an electronic display device 21 is projected into the X-ray beam in order to produce an image of the surface. This device 21 is used to set the distance between the collimator and the surface (see column 5, line 60, to column 6, line 42 of Kaiser et al.).

In rejecting claim 9 in the present Official Action, the Examiner conceded that Kaiser does not disclose a polycapillary X-ray optic, but asserted that such a feature is described by Longoni et al. ("A New XRF Spectrometer Based on a Ring-Shaped Multi-Element Silicon Drift Detector and on X-ray Capillary Optics"). In this regard, the Applicants point out that Longoni does not describe a polycapillary optic, as recited in amended claim 6, but rather a mono-capillary fiber integrated into the X-ray tube (see page 1002, column 2, lines 20-24, and Fig. 4, of

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Longoni et al.). It would have been impossible to use such an X-ray source in Kaiser's system, since there would have been no way to introduce any sort of optical radiation into Longoni's capillary fiber. There is no teaching or suggestion in the cited art that would have led a person of ordinary skill to use a polycapillary optic to convey both an X-ray beam and optical radiation as recited in amended claim 6.

Therefore, claim 6 as amended is believed to be patentable over the cited art. In view of the patentability of claim 6, dependent claims 7, 8 and 11 are believed to be patentable, as well.

Claim 13 recites a method for X-ray analysis of a sample in which an optical radiation source is aligned with an X-ray excitation source to illuminate and irradiate a spot on the sample. The optical radiation that is reflected from the sample is used in aligning the X-ray beam. The claim has been amended to incorporate the limitations of claim 14, now canceled, and thus states that the X-ray photons are received by a ring of X-ray detectors, while the optical radiation is received by an optical detector positioned in a gap in the ring. The gap in the ring is at a location that is radially displaced from the X-ray beam axis.

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In rejecting claim 14 in the present Official Action, the Examiner conceded that Kaiser does not disclose a ring arrangement of this sort, but noted that Longoni teaches a ring detector, which has a "gap" at the center. Longoni, however, neither teaches nor suggests the use of a gap that is radially displaced in order to accommodate an optical detector. On the contrary, Longoni would teach against the introduction of such a gap, since it would tend to reduce the solid angle for collection of X-ray fluorescence. (Longoni points out the importance of optimizing the solid angle in his abstract.) Furthermore, Kaiser's electronic display device is coaxial with the X-ray beam. Kaiser neither teaches nor suggests the possibility of a radially-displaced optical detector as recited in amended claim 13.

Therefore, claim 13 as amended is believed to be patentable over the cited art. In view of the patentability of claim 13, dependent claim 15 is believed to be patentable, as well.

Claims 1-5, 8, 9, 14 and 17 were rejected under 35 U.S.C. 103(a) over Kaiser in view of Longoni. Applicant has amended claim 1 in order to clarify the distinction of the present invention over the cited art. Claims 9, 14 and 17 have been canceled.

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Claim 1 recites apparatus for X-ray analysis of a sample, which comprises an X-ray excitation source and one or more X-ray detectors, which are arranged to define a ring having a gap therein. An optical radiation source is aligned with the X-ray excitation source to illuminate a spot on the sample. An optical detector in the gap in the ring receives reflected optical radiation and generates a signal that is indicative of the alignment of the spot with a target area of the sample. The claim has been amended, as was claim 13, to state that the gap in the ring of X-ray detectors is radially displaced from the beam axis. Therefore, claim 1 as amended is believed to be patentable over the cited art for the reasons stated above with regard to claim 13. In view of the patentability of claim 1, dependent claims 2-5 are believed to be patentable, as well.

In view of the patentability of amended claim 6, as explained above, dependent claim 8 is also believed to be patentable.

Claims 10 and 18 were objected to for depending from a rejected base claim, but were deemed to recite patentable subject matter. Claim 10 was also objected to for an informality in antecedence. These claims have accordingly been amended to stand as independent claims, incorporating the limitations of the base claims from which they formerly depended, and the informality in

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claim 10 has been corrected. Claims 10 and 18 are thus believed to be in condition for allowance.

New claims 19 and 20 have been added to more clearly and completely recite the features of the present invention. Claim 19 covers a method for X-ray analysis of a sample, including the limitations of original claims 13, 16 and 17. The claim recites the use of a polycapillary optic to focus both an X-ray beam and optical radiation onto the sample, and receiving the optical radiation reflected from the sample for purposes of aligning the X-ray beam. The limitations of this claim are thus similar to those of claim 6, while claim 20, which depends from claim 19, adds the same limitations as claim 15. Therefore, for the reasons stated above with respect to claim 6, claims 19 and 20 are believed to be patentable.

The Applicants have studied the additional references made of record by the Examiner and believe the claims as they presently stand to be patentable over these references, whether the references are taken individually or in combination with any of the other references cited above.

The Applicants believe the amendments and remarks presented hereinabove to be fully responsive to all of the objections and grounds of rejection raised by the Examiner. In view of these

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amendments and remarks, the Applicants respectfully submit that all of the claims in the present application are in order for allowance. Notice to this effect is hereby requested.

The Examiner is encouraged to telephone the undersigned Attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

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